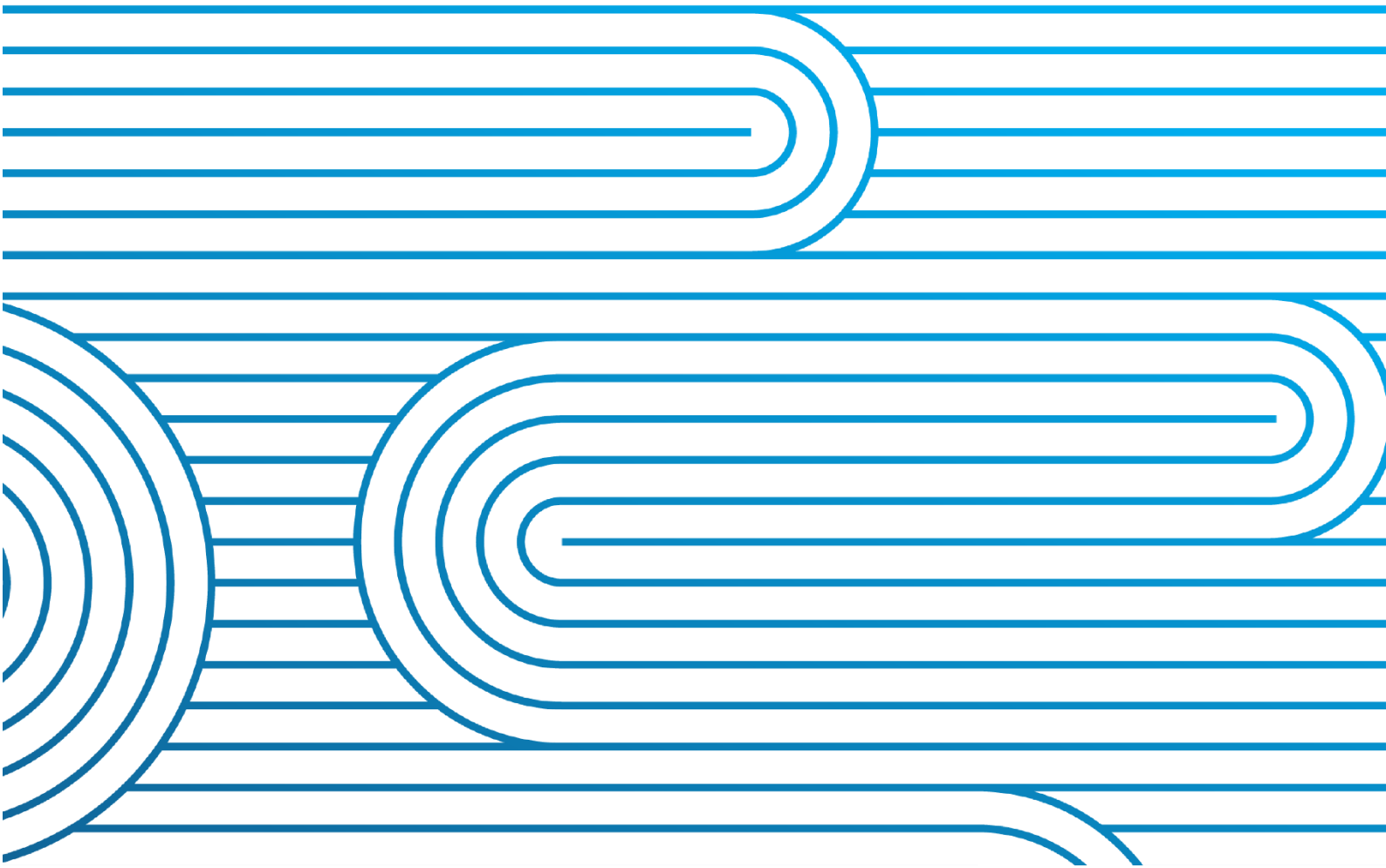
TRANSPOWER

Quarterly System Operator performance report

For the Electricity Authority

January to March 2024



Report Purpose

This report is Transpower's review of its performance as system operator for Q3 2023/24 (January to March 2024), in accordance with clause 3.14 of the Electricity Industry Participation Code 2010 (the Code), and SOSPA clause 12.3.

A system performance report is published on the Transpower website.

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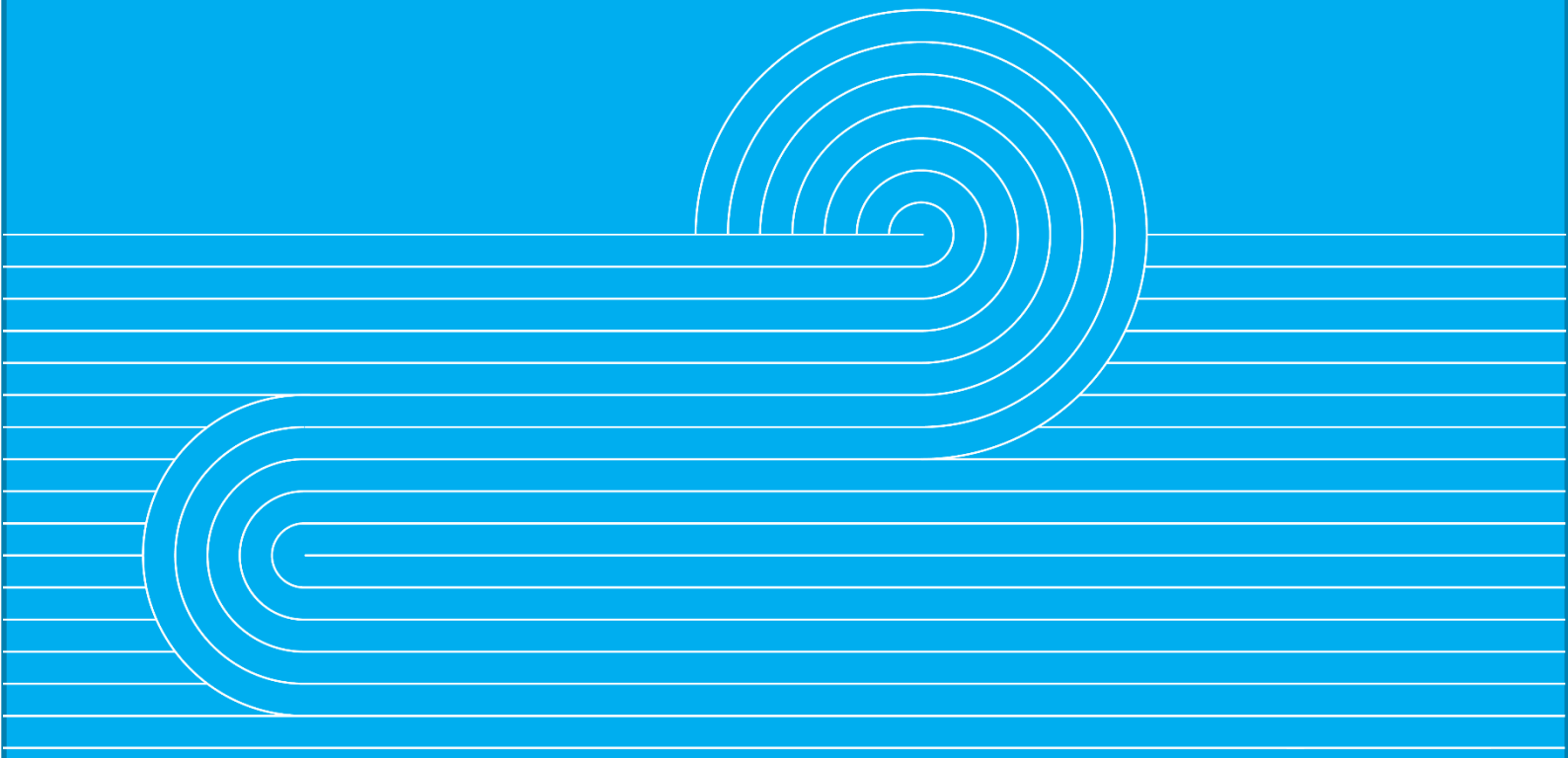
Commentary



High-level update (January to March 2024)

Operating the power system

- In January, there were a number of lower residual margins over mid-afternoon to evening peak periods. On these days, there was little base load thermal generation offered as a consequence of strong inflows to southern hydro catchments, resulting in conditions less suitable for slow start thermal generation to run.
- In February, we monitored risk and maintained a secure system when there were fires in the Port Hills and then in North Canterbury.
- In our role as system operator, we proactively communicated with the industry ahead of Transpower's HVDC bipole and monopole outages, asking industry to support the market by adjusting their reserve offers.

Power systems investigations and reporting

- There were no new significant events this quarter.
- We continue to support parties securely commission their generation. This quarter there were Arapuni governor upgrades and commissioning for testing for the Rangitaiki solar farm.
- We are trialling using additional coordination support for the commissioning process whilst we implement the first set of commissioning improvements identified through a process improvement initiative.
- We are engaging with Meridian (Ruakaka BESS) and Loadstone (Te Herenga O Te Ra solar farm) for their planned commissioning.
- We worked with NewPower to enable their Rotohiko battery to be offered and dispatched for reserves, both as injection and interruptible load.

Outage Planning and coordination

- For the first three months of 2024, the number of outage windows continued to be high but were proactively spread to reduce congestion. Even with this re-scheduling, congestion in weeks starting 18 March and 29 April is high and is being managed closely
- There are no potential short falls in NZGB currently as we head into winter, any low margins are being highlighted through the System Operator Industry forums and NZGB monthly reports.

Commitment to the evolving industry needs

- As part of winter 2024 readiness we published a *winter 2024 outlook* paper, highlighting the capacity and energy risks on the system for this year, and the need for increased investment in flexible resources (such as peaking generation, batteries and demand response) to manage these risks.
- We supporting the Authority consultations/proposals by submitting on: *Code Amendment Omnibus*, *Potential solutions for peak electricity capacity issues* and will be responding to: *Price discovery in a renewables-based electricity system, The future operation of New Zealand's power system.*
- We are working with the Authority and industry participants to improve both real-time market information and the quality of information provided to industry in the forward market schedules (up to 7 days ahead).

- During the quarter, the reduced coal stockpile at Huntly power station and reduced gas storage have increased the latest Electricity Risk Curves (ERCs) across 2024 and 2025. The latest ERCs for March, are available here.
- We consulted on System Operator Rolling Outage Plan (SOROP) from 7 February to 20 March (including asking for cross-submissions), during which time we ensured consumer representatives the Consumer Advocacy Council, Transpower's Consumer Advisory Panel members and the independent retailers were aware of our process.
- We are working with SolarZero to implement a dynamic response from their fleet of 13,000+ aggregated residential battery systems.
- In February, we were part of a Transpower visit to Australia for meetings with Transgrid, the Australian Energy Market Commission, the Australian Energy Regulator and VicGrid. The meetings covered a range of technical and regulatory issues impacting the transition to higher levels of variable renewable generation, including the integration of offshore wind, Transgrid's new responsibilities for maintaining system strength and the performance of batteries in the NEM.

Project updates

- Future Security and Resilience (FSR) Programme: Our frequency studies investigated thresholds for generators to be excluded from obligations and identified the impacts of changing generation mix on frequency excursions and fluctuations within the normal frequency band. The initial conclusions from voltage studies are that generating units installed connected to sub-transmission or GXP voltage need to have voltage obligations to manage distribution network voltage, that there is need for DER to meet fault ride through requirements and there is a need for distribution network operators and the system operator to coordinate on voltage levels and requirements.
- Automatic Under-Frequency Load Shedding (AUFLS) project: The first of the North Island distributors have begun transitioning to 4-block AUFLS.
- Demand Allocation Tool (DAT): We have gathered requirements for an automated mechanism for the control room which will be used to calculate demand limits accurately and equitably for participants, should a grid emergency be forecast in the forward schedules.

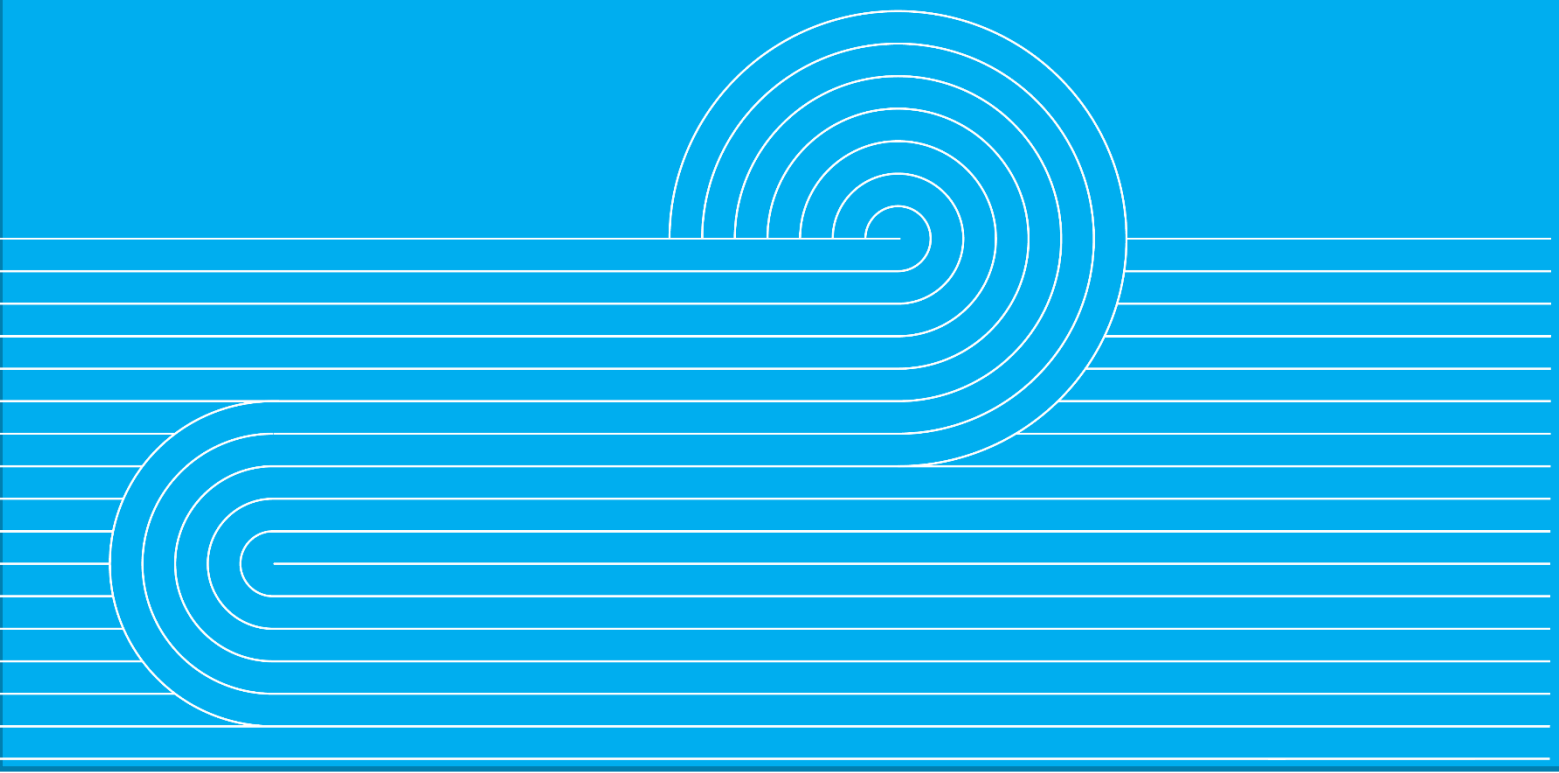
Compliance

- We have implemented several corrective and remedial actions to provide confidence the error in the automatic internal processing within the market system that occurred on 5 December will not recur.
- We responded to a Notice of Investigation issued by the Authority on 10 January related to the VSAT (voltage security assessment) modelling error between 7 February – 13 April 2022

SOSPA and Code annual deliverables

- We have delivered the draft SO Strategic Plan 2024, SO ICT Strategic Roadmap 2024, and Capex Plan 2024 this quarter, along with the RMT/SPD Annual Software Audit 2024.

System Operator performance



1 Operating the power system

There were several system events which we successfully managed over the quarter including:

January

We had lower residual margins towards the end of January, over mid-afternoon to evening peak periods. This occurred when there was a combination of wind generation dropping off quickly and high South Island generation as hydro generation captured uncontrolled inflows after recent rain events. As these conditions are less suitable for slow start thermal generation to run, it resulted in high HVDC transfer and no offered thermal generation to provide cover.

On hotter days, there is higher variability of demand and a longer sustained evening peak from mid-afternoon. A 1°C increase in temperature above forecast equates to approximately 100 MW of extra North Island demand (thought to be due to additional air conditioning load).

February

Port Hills Fire: The fire near Christchurch resulted in a tripping of the 110 kV circuits and a loss of supply at Bromley at 15:12 on 14 February. Orion NZ was able to restore supply to impacted customers within an hour via back-feeding from the Transpower Islington substation. The 110 kV circuits remained out of service while FENZ was fighting the fire, and until Transpower's service provider was able to complete a visual inspection of the asset. Supply was restored back to the Bromley substation at 16:56 the next day.

North Canterbury fire: A second fire in North Canterbury on 15 February 2024 was also closely monitored by the NCC control rooms as it posed potential risk to an area of the HVDC, and Islington-Kikiwa transmission towers. This fire was contained by FENZ prior to reaching any assets and had no operational impact.

South Island Reserves CANs: We proactively communicated with the industry ahead of the bipole and monopole outages, asking them to support the market by adjusting their reserve offers. A CAN was issued on 19 February to highlight the potential for South Island reserves shortfall during the bi-pole outage 24-25 February. The industry responded with updated offers. Another CAN was sent on 20 February to highlight a heightened risk of a temporary South Island reserves shortfall in the Real Time Dispatch schedule during periods when the HVDC is in monopole operation: again, the industry responded by updating offers.

March

There were no significant system activity or events during March.

2 Power systems investigations and reporting

Significant incident investigations

No new significant events were identified this quarter.

Commissioning

Arapuni governor upgrades: The two Arapuni governor upgrades (units 1 and 4) commissioned in late January.

Rangitaiki solar farm (Lodestone): A Customer Advice Notice was sent on 4 March to advise the Rangitaiki solar farm started generating on 6 March 2023. The solar farm will be classified as a Secondary Contingent Event (ECE) and commissioning risk applied while the plant is undergoing commissioning tests. Full capacity once commissioned will be 32 MW.

Commissioning process: We are trialling using additional coordination support for the commissioning process whilst we implement the first set of commissioning improvements identified through a process improvement initiative. One of the issues that we are focusing on is to ensure asset owners understand why they need to start their planning and engaging with the system operator appropriately early in the process as sufficient lead items are needed prior to first connection to the power system. Some asset owners are not meeting our guideline lead times despite being advised well in advance.

Rotohiko battery: We previously worked with NewPower on the commissioning of the 35 MW Rotohiko battery, which will inject at the Huntly market node. In the week of 26 February, they received an Ancillary Services contract under which Rotohiko can be offered and dispatched for reserves, both as injection and interruptible load.

Meridian Ruakaka BESS: We are engaging with Meridian on the plan for its 100 MW battery at Bream Bay.

Te Herenga O Te Ra solar farm: We are working with Lodestone who have started planning commissioning of their Te Herenga O Te Ra Solar farm, a 38 MW station connecting directly to Transpower's Waiotahe substation.

System Security Forecast (SSF)

We are looking to redesign the System Security Forecast for the next major update in December 2024 to ensure it is fit for purpose and is being delivered efficiently. We scoped the detailed project plan and have progressed pre-work in parallel. The Authority, as an interested stakeholder, has indicated it is supportive. The proposal will implement:

- A biennial review of risks to our principal performance obligations to include as scope of the SSF.
- Decoupling of the outage and market information from our Code obligations.
- A change in delivery approach to spread the work more evenly over the biennial Code commitment.
- A new reporting format and way of delivering the report.

The project will kick off in the second week of April with team training, to be delivered prior to the end of December 2024.

3 Outage planning and coordination

Outage planning – near real time

For the first three months of 2024, the number of outage windows continued to be high but were proactively spread to reduce congestion. Even with this re-scheduling, congestion in weeks starting 18 March and 29 April is high and is being managed closely.

New Zealand Generation Balance (NZGB) analysis

As is typical in summer, NZGB margins continued to be above 200 MW through January for N-1-G. CANs were sent out to industry informing of forecast South Island reserve shortfalls during the HVDC outage, to which the industry responded (more detail in Section 2). Forecast N-1-G margins remained healthy throughout the forecast horizon to late April, including during the HVDC outages running from 21 February - 14 March. The lowest N-1-G margin during the forecast period is 356 MW on 21 March.

There are no potential short falls in NZGB currently as we head into winter. There are some margins below 200 MW, in late April and in May for N-1-G. These are largely driven by planned generation outages combined with increasing demand. Margins are healthy during June and most of July, with low margins returning again for late July and first half of August. Should potential shortfalls appear less than one month from real time, the industry will be formally requested to consider rescheduling outages to improve margins on those dates via a CAN.

Operations Planning has highlighted these low margins through the System Operator Industry forums and NZGB monthly reports. We have also communicated that if available generation is not offered into the market, the margins may reduce further.

HVDC outage

We used a scenario approach to stress test our assessment of Transpower's (grid owner) HVDC outage in NZGB. This considered the availability of the Taranaki Combined Cycle power station and reduced Huntly generation due to Waikato River heating constraints. The outcome of this assessment was provided to the industry via the fortnightly SO industry forum on 30 January. This resulted in the grid owner moving the Te Mihi_Whakamaru transmission outage from 1 March to 2 March. The grid owner outage would have constrained up to ~430 MW of geothermal generation until after the HVDC outage is complete. Shifting this outage reduced the scenarios that could lead to shortfalls while the HVDC outage was taking place.

We continued to assess security for the series of pole and bi-pole outages which was completed on schedule by 14 March 2024. An additional single day outage of Pole 3 was required on 17 March 2024 to address an SF6 gas leak identified during the main outage. Our assessments were well communicated to market and completed successfully.

Annual Outage Forum

In our system operator role, we covered the security impacts of the Transpower outage plan at the Annual Outage Forum held online on 21 March.

4 Commitment to the evolving industry needs

Winter 2024 readiness

Market Insight paper: Our Winter 2024 Outlook paper was published on 31 January. It highlights the capacity and energy risks on the system for this year, and the need for increased investment in flexible resources (such as peaking generation, batteries and demand response) to manage these risks. It builds on our Winter 2023 Review paper, published in October 2023, which reviewed the performance of the electricity system and market response over last winter.

Pan-industry exercise: We continue to engage with the Authority on planning activities for the industry exercise running across two days in May. Day 1 (1 May 2024) focuses on the operational response and will be facilitated by Transpower as system operator. Day 2 (8 May 2024) focusing on communication with end consumers and will be facilitated by the Authority with our support.

Supporting the Authority consultations/proposals:

- On 9 February, we submitted to the Authority's *Code Amendment Omnibus* consultation, supporting the three proposed changes. These included a proposal to amend the Code to permanently implement Option E (Clarify availability and use of 'discretionary demand' control) from their Winter 2023 work programme which requires distributors to signal their controllable load (discretionary demand) to the system operator via difference bids.
- On 1 March, Transpower submitted to the Authority's consultation *Potential solutions for peak electricity capacity issues*, primarily as system operator.
- On 1 March, the Authority published its response to the MDAG recommendations in its final report *Price discovery in a renewables-based electricity system*. The Authority is prioritising work underway on seven of the MDAG recommendations. Several of these will have high input from Transpower as system operator (such as short-term forecasting, 'new reserve product', and the Future Security and Resilience programme.) The Authority has advised it will add the remaining eight tranche 1 recommendations to their work programme. This includes investigating further 'price-driven secure distribution dispatch' and 'demand-side flex interface systems and protocols', which will need considerable Transpower involvement.
- Our Market Services team contributed to the development of the Transpower submission on *The future operation of New Zealand's power system*.

Winter risks strategy and tactics review: We are completing a review of the strategy and tactics we use to manage tight capacity margins risks (when residual is low) and for responding to the energy risks (as dry periods evolve). The strategy and tactics for both risks cover planning time frames (8 days ahead or more), operational time frames (7 days ahead or less) and look-back analysis. Our intention is to ensure we are consistent in how we inform the industry of risk so that participants and stakeholders are prepared should an event happen. In general, we received positive feedback on how last winter was managed and expect the winter 2024 strategy to be a refinement of that used for winter 2023.

Improving intermittent generation forecasting: We are working with the Authority and industry participants to improve both real-time market information and the quality of information provided to industry in the forward market schedules (up to 7 days ahead). Work includes:

- Working with the Authority to enhance and embed the initiatives put in place for winter 2023, which included providing residual information to the market, sensitivity schedules and greater visibility of wind forecasts.
- Working with individual generators to increase the use of wind forecast models and reduce the use of persistence forecasts to inform their market offers.
- Engaging with Authority staff to support their project to improve the accuracy of intermittent generation (IG) forecasts. Recognising that the project will not deliver a centralised wind forecast pre-winter 2024, we proposed interim solutions be considered

which could be implemented by winter 2024. These could include a guidance note on what good IG offering practice looks like and the publication of IG offer accuracy metrics by the Authority. We have also suggested the Authority provide clarity of the existing Code obligations and consider whether there is a need for Code changes prior to final project delivery.

Security of Supply

Electricity Risk Curves (ERCs): During the quarter, the reduced coal stockpile at Huntly power station and reduced gas storage have increased the ERCs across 2024 and 2025. The latest ERCs (for March) are available here. There was a slight decrease over March to the ERCs across 2024 due to a reduction in forecasted industrial gas consumption, despite a decreased gas production forecast.

System Operator Rolling Outage Plan (SOROP): The SOROP is used to determine when an electricity supply shortage would be declared and how this would be managed. We prepared a consultation package on a proposed update to the SOROP and received consent to consult from the Authority on 25 January. Consultation ran from 7 February to 20 March, during which time we ensured consumer representatives the Consumer Advocacy Council, Transpower's Consumer Advisory Panel members and the independent retailers were aware of our process. We received and published ten submissions and five cross submissions. We are working through our response to those submissions and expect to submit a SOROP proposal to the Authority for its consideration by the end of May.

Connecting with the industry

Ministerial visits: In January, we hosted the new Minister for Energy, Simeon Brown, and two of his staff for a tour of our Wellington control room (NCC). The Minister was very engaged and interested in the work we and the wider industry do and how we do it. He was particularly interested in the resiliency of our service and the amount of generation available compared to load. The Minister had a keen interest in the detail and asked lots of questions. His staff were provided with the requested links to information such as our live data and market operations reports.

In March, we hosted the State-Owned Enterprises Minister, Paul Goldsmith, for a tour of NCC. The Minister was particularly interested in the accuracy of our wind forecasting as the MetService is also within his portfolio and many economic aspects such as how the market price is determined.

Electricity Networks Aotearoa (ENA) visit: In January, we hosted Tracey Kai and her team from the ENA for an NCC control room visit in Wellington and an Operations 101 session with the senior leadership team. The ENA represents our lines company partners, so it was a great opportunity to give them insight into how we operate the system and the challenges we face to keep electricity flowing to their members every second of the day.

SolarZero DER: We are working with SolarZero to implement a dynamic response from their rapidly growing fleet of 13,000+ aggregated residential battery systems. SolarZero has been participating in the instantaneous reserves on a provisional basis, with the

capability to provide a binary reserve response only. Additional instantaneous reserves will free up more generation for energy to meet the tight winter capacity situations.

New Zealand Generation Balance (NZGB) refresh: We have reviewed the inputs into the NZGB model with consideration for accuracy and a more uncertainty planning environment[1]. This included discussions with material NZGB users. From the review we will be updating the demand forecast to a probabilistic forecast model from Tesla allowing for more statistical analysis and updating our supply scenarios to show total capacity vs firm capacity reflecting our growing pool of uncertain resources in the planning timeframe. The implementation of this change will require IST resource, and the timing and costings are being developed with an aim for delivery this financial year. Once timing of delivery is understood, we will formally engage industry on the changes.

Participant survey: Our annual participant survey, distributed on 22 March, is an opportunity for participants to provide feedback to us, including what we are doing well and where we need to up our game.

Weekly Market Movements: Every Tuesday we publish a Market Operations weekly report on our website (or via email to subscribers) containing the latest information about the electricity market, including security of supply, wholesale price trends and system capacity. The report also contains an insight on topical item for that week. The following insights were provided this quarter (the report date refers to the week ending date):

January

- 7 January: Low demand over the holiday period.
- 14 January: Summer load profiles around the country.
- 21 January: Factors influencing recent high prices.
- 28 January: Energy prices in the last week

February

- 4 February: The high prices and lower residual generation margin on 31 January.
- 11 February: The impact of persistence and non-persistence wind offers and their impact on the residuals.
- 18 February: Intermittent generation offer accuracy and the impact of using persistence offers.
- 25 February: The factors contributing to the publication of the Customer Advice Notice on 20 February for potential South Island Reserve shortfalls last week.

March

- 3 March: Real Time Price Inversion.
- 10 March: Net Free Reserves (NFRs).
- 17 March: High spring washer prices at Invercargill and Tiwai.
- 24 March: How Does Price Correlate with Demand?
- 3 March: How Does Price Correlate with Hydrology?

[1] In this this context, the planning timeframe is 200 days, the length of the NZGB forecast.

Supporting the Authority

During February we held a brainstorming session (consistent with a SOSPA performance metric) with the Authority's Operational Policy and Future Security and Resilience (FSR) teams. The session focussed on informing planning of the Authority's FY25 work plan. The Authority shared the Technical Advisory Service (TAS) work they are considering for the coming financial year, and we raised other potential matters for their consideration. The meeting was constructive and highlighted strong alignment on priority improvements to the current market arrangements and impacts on operating the power system.

Media interactions

Date	Outlet/type of engagement	Details	Coverage
2 Feb	RNZ – Kathryn Ryan Nine To Noon	Request to interview someone about risk of rolling outages due to potential dry conditions this winter. Interview arranged with Alison Andrew to coincide with release of Winter '24 Outlook paper and with the focus switched to winter capacity risk	Report
2 Feb	Media release: Winter 2024 outlook for power system released	Proactive media release regarding outlook for Winter '24	NZ Herald Energy News
19 Feb	Energy News and Stuff	Asked about CANs regarding HVDC planned outage and South Island reserves. Comment provided, attributed to Chantelle Bramley. Grid owner also provided comment independently.	Energy News report Stuff did not run a story
23 Feb	Energy News	New editor asked for "on background" briefing on key power system issues. Briefing provided by Principal Communications Advisor Nathan Green	No story resulted
26 Feb	Media release with Ara Ake and Solar Zero: Innovative pilot shows Virtual Power Plants can play an important role in managing winter peaks » Ara Ake	Supported development of media release and provided key media contacts. Additional comment also supplied to Newsroom on future of power system, attributed to Chantelle Bramley	Newsroom Energy News TechDay/ChannelLife
6 Mar	LinkedIn Post	Our National Coordination Centre (NCC) and National Grid Operating Centre (NGOC) teams carried out a simulation exercise with industry last week to test processes for restoring power to the South Island following an island wide black out.	Post

Date	Outlet/type of engagement	Details	Coverage
12 Mar	LinkedIn Post	New Zealand's power system took a step towards a more flexible and responsive future last week with WEL Networks' utility-scale battery at Rotohiko offering injectable reserves to the electricity market for the first time.	Post
4 Mar	TVNZ Breakfast	Asked for studio interview re winter risk. Alison Andrew appeared live	Interview
19 Mar	LinkedIn Post	Lodestone Energy Limited's solar farm at Edgecumbe, bordering the Rangitaiki River, offered energy into the market for the first time last week in another big step for New Zealand towards a more highly renewable electricity system	Post
28 Mar	RenewEconomy Australia	Wanted comment on rooftop solar and virtual power plants. Repurposed response to Newsroom following Ara Ake media release.	Report

Learning from others

In February, Chantelle Bramley, EGM Operations and John Clarke, EGM Future Grid visited Australia for meetings with Transgrid, the Australian Energy Market Commission, the Australian Energy Regulator and VicGrid. The meetings covered a range of technical and regulatory issues impacting the transition to higher levels of variable renewable generation, including the integration of offshore wind, Transgrid's new responsibilities for maintaining system strength and the performance of batteries in the NEM. A further visit by the Operations team to the Australian Energy Market Operator's control room is planned for the next quarter.

High court decision on 9 August 2021 scarcity pricing

On 16 February, the High Court released its decision on the claims concerning pricing for six trading periods on 9 August 2021. The Authority instructed NZX to finalise the prices on 1 March. As system operator we are responsible for providing settlement information to the clearing manager for ancillary services. Along with the other service providers, we met with the Authority to initiate the process to advise them of our timing and cost estimates to settle the market using the non-scarcity prices as directed by the High Court. Our estimates for settling ancillary services were sent to the Authority on 28 March. We are now awaiting next steps from the Authority and expect to agree a Technical Advisory Services (TAS) statement of work shortly. Fulfilling our settlement obligations will require non-standard practices and manual interventions.

5 Project updates

5.1 Market design and service enhancement project updates

Progress against high value, in-flight market design, service enhancement and service maintenance projects are included below along with details of any variances from the current capex plan.

Future Security and Resilience (FSR) Programme
Our studies in support of the Authority's review of Part 8 Common Quality Requirements are progressing to plan. In summary we:

- finalised our draft reports on our frequency and voltage studies for review at the Common Quality Technical Group in early April. The frequency studies investigate thresholds for generators to be excluded from obligations, and the impacts of changing generation mix on frequency excursions and fluctuations within the normal frequency band. The initial conclusions from voltage studies are that generating units installed connected to sub-transmission or GXP voltage need to have voltage obligations to manage distribution network voltage, that there is need for DER to meet fault ride through requirements and there is a need for distribution network operators and the system operator to coordinate on voltage levels and requirements.
- worked with the Authority who has produced three draft options papers on frequency, voltage and fault ride through (and harmonics). We are gathering a list of changes to Part 8 to make the Code more aligned to the technologies and current operating environment.

Extended Reserves – Automatic Under-Frequency Load Shedding (AUFLS) project
The first of the North Island distributors have begun transitioning to 4-block AUFLS. We are supporting this transition for the Authority which involves reviewing changes to monthly plans, assessing potential security impacts, approving any changes and notifying non-adherence to plans to the Authority. In February, five distributors submitted change requests for March 2024 and future months. All four of the change requests for March have been approved. Our March transition report has been completed for the Authority. Since the start of the transition period, we have actively engaged with the Authority on four reported non-adherences to plan. We hosted our Quarterly Industry Meeting on the AUFLS transition on 27 March, where we shared observations to date.

Demand Allocation Tool (DAT)
This project will deliver an automated mechanism for the control room to calculate demand limits accurately and equitably for participants, should a grid emergency be forecast in the forward schedules. This tool replaces the Load Shed Restore (LSR) tool which underperformed in the 9 August 2021 event.

Activities during March have focussed on completing the requirements gathering workshops, which have now been completed and questions closed out. Stakeholder requirements have now been approved. Drafting of the IST Delivery Approach has now begun.

5.2 Other projects and initiatives

System Operator Service Provider Agreement (SOSPA) contract reset
The current SOSPA contract will expire on 30 June 2025 and we are working with the Authority towards resetting it.

Operational Excellence
We have completed a review and prioritisation of the backlog of defects and enhancements relating to market system and other critical tools. We are now looking to size the work required to address these with a view to including in delivery planning.

The team has been refining resource forecasting to provide a view over an 18-month horizon. The goal is to ensure that sufficient skilled resources are available to cover periods of increased workload, enhanced training, and to support planned projects – while taking into consideration speed to competency for new starts and projected attrition rates.

We have also focussed on progressing both the coordinator training and capability workstreams. This involves a competency framework and rollout of an assessment tool both of which incorporate learnings from a trial.

Market System data migration
This project is to migrate market system data to our new data warehouse with the purpose of supporting our data and analytics capability into the future. The solution architecture design has been endorsed by the Architectural Review Board. Stakeholder mapping, capacity modelling and secure file transfer integration with staging environment for data ingestion is in progress.

Credible Event Review (CER)
The 2024 CER scope was published in December, which sets the work programme to be completed before December 2024.

We are currently working on two deliverables; reviewing the stability definition and controls in the System Operator Policy Statement; and reviewing risk management during the HVDC cable discharge period. Both are being drafted in April and will undergo consultation later in the year.

Network Modelling and Commissioning database
We are progressing the development of a network modelling database prototype. It is expected this will reduce risk of modelling errors and improve efficiency.

6 Technical advisory hours and services

The following table provides the technical advisory hours for Q3 2023/24 and a summary of technical advisory services to which those hours related (SOSPA 12.3 (d) refers).

TAS Statement of Work (SOW)	Status	Hours worked during Q3
TAS SOW 106 – FSR Workstream – supersedes TAS 102	In progress	802.5
TAS SOW 108 – Extended Reserve Implementation (Phase III)	In Progress	271.0
TAS 110 - Winter 2023 Options Permanent Implementation	In progress	33.0
Total hours		**1,106.5**

7 Risk & Assurance

Risk Management

We have developed a draft risk register. This contains the wider system operation risks that we will present and discuss with the Authority. The register includes both external and internal risks or threats. It serves as an input to our Operations risk bowtie and will help identify threats/risk controls which have not yet been captured.

We are preparing a paper for the Transpower Audit and Risk Committee on the topic of system operator risk appetite.

Our six-monthly review of half our critical controls is underway for completion in May.

Business assurance audits

The 2023/2024 audit plan is on schedule and is progressing as follows:

- Two audits are completed and provided to the Authority for review – SO gatekeeper actions, Discretion on Demand/Generation.
- A third audit - Inputs to Reserve Management Tool - is in draft and undergoing senior leadership review.
- The last two audits are underway with one at the drafting stage - Synchronising and reconnecting an Island, and the final audit, covering our main security of supply process, underway.

8 Compliance

Market impact for previously reported self-breach: We reported a system operator self-breach on 5 December, which related to a modelling error in the 16:55 RTD solve on 4 May 2023. The event was caused by an error in the automatic internal processing within the market system, which had never occurred previously and could not have been detected. The error persisted for the 5-minute RTD solve and caused a market impact of $14,000 - $18,000. IST implemented several corrective and remedial actions, and we are confident the error will not recur.

Investigation: The Authority issued a Notice of Investigation on 10 January related to the VSAT (voltage security assessment) modelling error between 7 February – 13 April 2022. Transpower provided a response on 24 January 2024.

9 Impartiality of Transpower roles

We have two open items in the Conflict of Interest Register (below). These are being actively managed in accordance with our Conflict of Interest procedure.

System Operator Open Conflict of Interest Issues		
ID	Title	Managed by
40	**General System Operator/Grid Owner dual roles:** This is a general item that will remain permanently open to cover all employees with a dual system operator/grid owner role. The item documents the actions necessary to ensure impartiality in these circumstances; these items will be monitored to ensure their continue effectiveness.	SO Compliance & Impartiality Manager
41	**General relationship situation:** This is a general item that will remain permanently open to cover all potential	SO Compliance & Impartiality Manager

System Operator Open Conflict of Interest Issues		
ID	Title	Managed by
	conflicts of interest arising under a relationship situation. This item documents the actions necessary to prevent an actual conflict arising and will be monitored by the SO Compliance & Impartiality Manager to ensure their continued effectiveness.	

10 Performance metrics and monitoring

We have updated our performance metrics for the 2023-24 year to focus on outcomes desired by both the Authority and Transpower. The details of these relationships and commentary on current progress is contained in Appendix B.

The first and second quarterly reviews have taken place, at this stage the Q3 scores are interim prior to the quarterly performance metrics discussion.

Q3 interim outcome scores		Year end forecast
New security and reliability risks are identified and appropriately managed	O1 Score 2.67	O1 Score 3.40
Significant events are appropriately scoped, understood, prepared for and managed	O2 Score 2.57	O2 Score 3.77
The Authority is supported to evolve and develop the electricity market and power systems	O3 Score 3.30	O3 Score 4.31
Relevant market information is made accessible to stakeholders	O4 Score 3.50	O4 Score 4.50
Stakeholders are effectively informed on and included in decisions where relevant	O5 Score 3.42	O5 Score 4.36
Stakeholders are satisfied with our service	O6 Score 4.02	O6 Score 4.44
SOSPA delivery provides value	O7 Score 3.10	O6 Score 4.30
	Overall Outcome Score 3.08	Overall Outcome Score 4.03
	Performance % Score 71%	Performance % Score 80%

Score	Level of performance
1	Poor/unacceptable performance, requires focused improvement
2	Partially meets requirements, some improvement needed
3	Performance of all requirements in line with requirements of the Code and SOSPA
4	Exceeds some aspects of what is required by the Code and SOSPA
5	Consistent delivery of exceptional performance of (or beyond) what is required by the Code and SOSPA

10.1 SOSPA and Code annual deliverables

SO Strategic Plan and Capex Plan 2024: The draft versions of the SO Strategic Plan and Capex Plan were delivered to the Authority on 14 February. The Strategic Plan was discussed at the Authority's MOC meeting on 28 February. This year, our engagement with the Authority on the SO strategic plan will inform our SOSPA3 proposal in June.

SO ICT Strategic Roadmap 2024: The draft version of the SO ICT Strategic Roadmap was delivered to the Authority on 28 March.

RMT/SPD Annual Software Audit 2024: The annual software audit was delivered to the Authority on 2 April.

11 Cost of services reporting

The cost of services reporting for 2022/23 will be delivered by the end of the financial year.

12 Actions taken

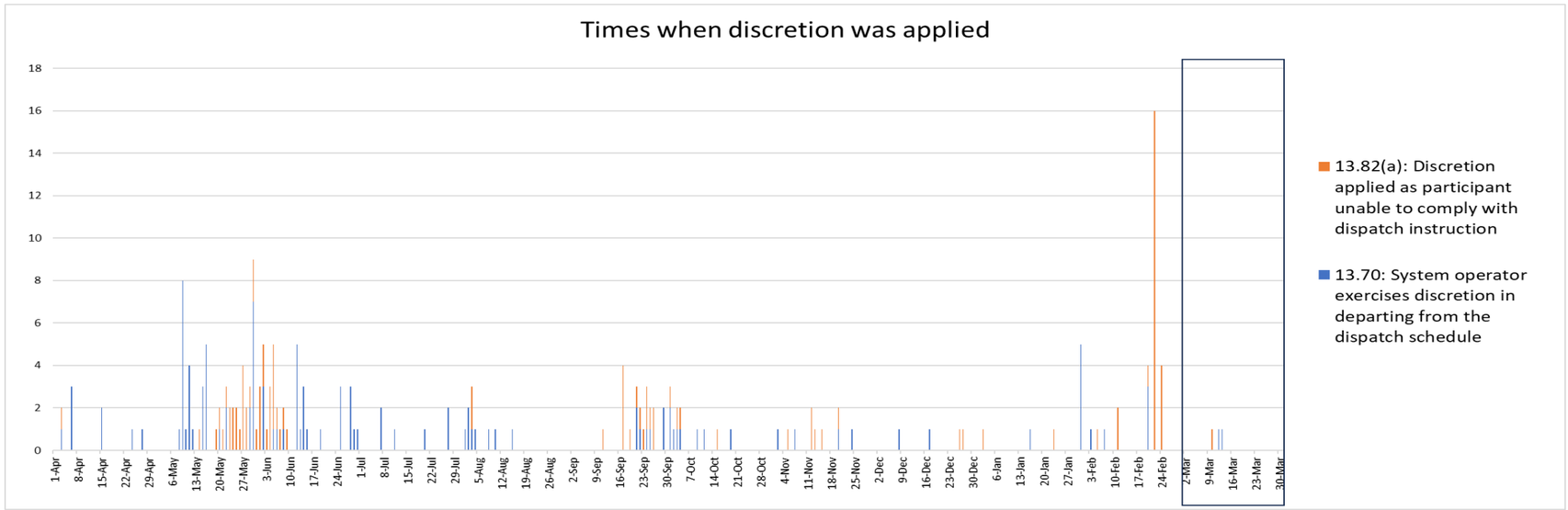
The following table contains a full list of actions taken during Q3 2023/24 regarding the system operator business plan, statutory objective work plan, participant survey responses and any remedial plan, as required by SOSPA 12.3 (b).

Item of interest	Actions taken
(i) To give effect to the s**ystem operator business plan**:	• **Enable whole system operation through participation in the ENA Future Network Forum's workstream on SO/EDB interfaces.** *We are an active member of the Electricity Networks Aotearoa (ENA) Future Networks Forum (FNF) and presented at the Innovation Forum ENA FNF hosted on 12-13 March.* • **Plan the activities and themes to support the SOSPA3 reset process.** *In agreement with the Authority, workshops are scheduled to start in April.* • **New performance metrics agreed with the Authority are operationalised and matured.** *Operation of these metrics is maturing well, with learnings expected to inform minor refinements for the 24/25 performance metrics.*
(ii) To comply with the **statutory objective work plan**:	• **Review the current scope and timing of SOSPA deliverables.** *Streamlining reporting is one of the workshop themes in the SOSPA3 negotiations. The first workshop is planned for April.*
(iii) In response to participant responses to any **participant survey**:	**Feedback from the 2022-23 survey** • **From my observations Transpower as the SO strives to meet the market needs in an ever-increasing challenging environment, I believe they are constantly looking at methods to improve their service and meet the needs of the industry.** • **Transpower has done a good job at conveying recent information. Passing real time information between Transpower & distribution operators could be improved.** *These comments highlight the work we have been doing to meet the needs of the industry have been recognised and that there are other areas where we need to turn our attention to. This year, EDB controllable load information has been made available to the Transpower control rooms to enable a better understanding of the type of load available for demand reduction when there are potential low residual situations.*
(iv) To comply with any **remedial plan** agreed by the parties under SOSPA 14.1	N/A – No remedial plan in place.

Appendices

Appendix A: Discretion

The graph below shows all instances of discretion application with a summary beneath of the individual instances of application.



January – 8 instances

6 applied in response to discretion clause 13.70,

- 16 Jan – WHI2201 WHI1 unit tripped,
- 31 Jan (5 instances) - WHI2201 WHI Low residual, required on for reserves and energy with reducing wind and increasing load.

2 applied in response to traders claiming discretion clause 13.82(a),

- 2 Jan - SPL dispatched below min of 141MW to 137MW. Trader claimed rule 13.82(a) due to plant safety.
- 23 Jan - RTD solving with HLY5<182MW. Cheapest solution to keep at 182MW rather than dispatching off and not being available for remainder of day.

February – 29 instances

5 were applied in response to discretion clause 13.70,

- 3 Feb – RPO_TNG tripped due to suspected lightning.
- 7 Feb – WHI2201 WHI required for reserves over the evening peak to alleviate drastic drop in wind between forecast and actual.
- 20 Feb (3 instances) – Discretion applied to MAT1101 to avoid protection tripping circuit EDG_OWH_2 and then overloading KAW T13 (due to KAW T12 outage).

24 were applied in response to discretion clause 13.82(a),

- 5 Feb – HLY5 kept on above 182MW to avoid dispatching off and not being available for the rest of the day.
- 11 Feb (2 instances) – HLY5 dispatched below their minimum but kept on due to plant safety.
- 20 Feb - HLY5 dispatched below their minimum, but least cost solution is to keep on.
- 22 Feb (16 instances) – WHI2201 dispatched below min generation but kept on due to safety.
- 24 Feb – SPL dispatched below their minimum, but least cost solution is to keep on.
- 24 Feb – NAP dispatched below their minimum, but least cost solution is to keep on.
- 24 Feb (2 instances) – HLY5 dispatched below their minimum, but least cost solution is to keep on.

March – 3 instances

2 applied in response to discretion clause 13.70,

- 12 Mar – KUM0661 KUM0 required to support GZ12 100% VSAT.
- 13 Mar – HLY2201 HLY2 tripped at 12:07 from 180 MW.

1 applied in response to traders claiming discretion clause 13.82(a),

10 Mar – NAP scheduled below 145 MW in the NRSL. Ops case run and the least cost option is to keep NAP on 145 MW.

Appendix B: Performance Metrics

Scoring

Q3 scores are shown as shaded cells in the figure below, the year-end forecasts are shown by blue text in a bright blue outline.

A number of the metrics cannot be reported on as they are dependent on actions that will happen later in the year. Of those that have reported, we anticipate the scores to improve as we increase the number of items to be delivered during the year.

Performance metric scores as at March				Score out of 5						
Metric	Definition	Q3	Year end	1	2	3	4	5	N/A	Comment
PM1	Risk register has been updated and tested externally with the Authority and widely among industry participants	3	3	Internal Risk Register has not been updated in the last 12 months, no engagements have been held to identify new threats or assess current threats	Internal Risk Register has been reviewed and updated internally in the last 12 months	Internal Risk Register has been reviewed and updated internally in the last 6 months	An annual workshop is held with the Authority, OR representatives from a diverse range of stakeholders, to review threats and identify and assess new security and reliability threats	An annual workshop is held with each of the Authority, AND representatives from a diverse range of stakeholders, to review threats and identify and assess new security and reliability threats		Risk register under development
PM2	% of SMART actions from the control self-assessment with maturity ratings of 1 or 2 will be addressed by the planned due date	2	2	< 50% of SMART actions with a maturity rating of 1 and 2 are completed by due date	≥ 50% of SMART actions with a maturity rating of 1 and 2 are completed by due date	≥ 75% of SMART actions with a maturity rating of 1 and 2 are completed by due date	100% of SMART actions with a maturity rating of 1 and ≥ 75% of SMART actions with a maturity rating of 2 are completed by due date	100% of SMART actions with a maturity rating of 1 and 2 are completed by due date		This score is impacted by two actions allocated prior to staff change. Although progress has been made on this actions they are not at "completion" state
PM3	At least one pan-industry event exercise held to test existing controls	3	5	-	-	0 pan-industry event exercises	1 pan-industry event exercise	2 event exercises (1 of which must be a pan-industry exercise) – includes smaller event exercises with industry involvement		The pan-industry exercise is currently being planned for 1 May Completed the Black Start simulation exercise
PM4	% of actions from industry exercises which were completed on time	N/A	3	< 50 %	≥ 50 % and < 65 %	≥ 65 % and < 75 %	≥ 75 % and < 100 %	100%		There are currently no actions
PM5	Average score of internal process assessments arising from significant events	N/A	N/A	Poor	Below Expectations	Acceptable	Good	Excellent		There are no internal process assessments
PM6	Percentage of actions from significant events which are closed on time	2	4	< 50 %	≥ 50 % and < 65 %	≥ 65 % and < 75 %	≥ 75 % and < 100 %	100%		2 of the 4 actions due at the end of 2023 were not completed to schedule. The 4 scheduled for completion at the end of June are on target.
PM7	On time delivery of significant event reports	N/A	N/A	Less than 100% of major preliminary reports delivered on time	All major preliminary reports and 60% of other reports delivered on time	All major preliminary reports and 80% of other reports delivered on time	100% of all reports delivered on time	Score not available		There are no significant event reports
PM8	Average satisfaction score from stakeholders, as per responses received to transactional surveys taken at forums and asked for in correspondence	5	5	< 35 %	≥ 35 % and < 50 %	≥ 50 % and < 70 %	≥ 70 % and < 85 %	≥ 85 %		The responses to the Market Matters weekly update have been very positive and provided good feedback. Getting good feedback from Industry forum - but enthusiasm has dulled a bit since the beginning
PM9	All categories of stakeholders are actively engaged by the system operator throughout the year	2	3	SO Annual Participant Survey is not sent to a diverse range of stakeholders	SO Annual Participant Survey sent to a diverse range of stakeholders to request their feedback on how well they believe market information has been made accessible to them	Responses are received from a diverse range of stakeholders and are considered by the SO for improvement of engagement activities	Specific action is taken to build engagement from a diverse range of stakeholders	More than one action is taken as a result of feedback received from the Annual Participant Survey or other industry mechanisms and forums, with the aims of improving engagement with stakeholders		The annual participant survey will be carried out in the March-May period
PM10	% of industry submissions, made in response to system operator consultations, which are responded to	3	5	Not all submissions acknowledged	All submissions acknowledged and < 50% responded to	All submissions acknowledged and ≥ 50 % responded to	All submissions acknowledged and ≥ 75 % responded to	All submissions acknowledged and ≥ 90 % responded to		2 consultation have been produced. We have acknowledged submissions from both and responded to the earlier submission on evolvinf SoS, the responses to the SOSA reference cases is currently being drafted and once done will increase the score to a 5
PM11	Stakeholder engagement in project delivery	5	5	The stakeholder engagement planning process is not undertaken during the year – ie no list of suitable projects and target list of stakeholder engagement is created	A list of suitable projects and target list of stakeholder engagement is created	The consultation process for the projects is carried out	Stakeholder engagement is actively monitored and managed throughout the year	Stakeholder input is incorporated into the process		The list of projects has been provided to the Authority and of the 6 indentified only two have reached the stage for stakeholder input, which has been provided in each of these.
PM12	Average satisfaction score from stakeholders from Annual Survey	N/A	4	< 73 %	≥ 73 % and < 76 %	≥ 76 % and < 80 %	≥ 80 % and < 83 %	≥ 83 %		The annual participant survey will be carried out in the March-May period
PM13	Average score from stakeholders on their perception of SO impartiality	N/A	5	< 60 %	≥ 60 % and < 65 %	≥ 65 % and < 75 %	≥ 75 % and < 80 %	≥ 80 %		The annual participant survey will be carried out in the March-May period
PM14	Number of thought leadership publications on specific areas of system operator work that affect and/or are of interest to the industry	4	5	Score not available	No thought leadership publications in the financial year	1-2 thought leadership publications in the financial year	3-4 thought leadership publications in the financial year	>4 thought leadership publications in the financial year		Two further thought pieces are planned for Q3
PM15	Active contribution by the SO to Authority led-forums and consultations; and industry-led consultations	4	4	SO does not respond to any consultations and forums advised by the Authority as requiring system operator response	SO does not respond to all consultations and forums advised by the Authority as requiring system response	All Authority consultations and forums advised as requiring SO response are responded to	And some industry-led consultations responded to	And some industry-led forums contributed to		We have responded to 5 Authority consultations (inc all 3 on the list of required responses) and 5 industry consultations
PM16	# of SO Industry Forums held	3	5	Score not available	1-10 forums	11-19 forums	20 or more forums	20 or more forums, plus 1 longer format forum		These are being held every fortnight and will reach the 20 or more forums target by the end of the year
PM17	% of key SOSPA documents delivered on time to the Authority	3	3	< 70%	≥ 70 % and < 100%	100%	Score not available	Score not available		All documents delivered as agreed, with any changes to the current SOSPA targets agreed by the parties ahead of time
PM18	Quarterly update/challenge/brainstorm sessions	3	4	0 sessions	1-2 quarterly sessions	3 quarterly sessions	4 quarterly sessions	Score not available		2 have been held so far, the next one will be scheduled in March

Appendix B (cont): Performance Metrics

Relationship between performance metrics and outcomes

These relationships explain why some performance metrics have a greater influence on the outcomes than others.

Note: Where the score of the performance metric is currently N/A, that performance metric does not contribute to the outcome or overall score

Performance metric ref	Metric	O 1: New security and reliability risks are identified and appropriately managed	O 2: Significant events are appropriately scoped, understood, prepared for and managed	O 3: The Authority is supported to evolve and develop the electricity market and power systems	O 4: Relevant market information is made accessible to stakeholders	O 5: Stakeholders are effectively informed on and included in decisions where relevant	O 6: Stakeholders are satisfied with our service	O 7: SOSPA delivery provides value	PM contribution to overall outcome score
PM 1	Risk register has been updated and tested externally with the Authority and widely among industry participants	0%	0%	0%	0%	0%	0%	0%	0%
PM 2	% of SMART actions from the control self-assessment with maturity ratings of 1 or 2 will be addressed by the planned due date	33%	17%	0%	0%	0%	0%	0%	11%
PM 3	At least one pan-industry event exercise held to test existing controls	17%	33%	9%	9%	0%	0%	11%	15%
PM 4	% of actions from industry exercises which were completed on time	0%	0%	0%	0%	0%	0%	0%	0%
PM 5	Average score of internal process assessments arising from significant events	0%	0%	0%	0%	0%	0%	0%	0%
PM 6	Percentage of actions from significant events which are closed on time	17%	33%	9%	0%	0%	0%	0%	13%
PM 7	On time delivery of significant event reports	0%	0%	0%	0%	0%	0%	0%	0%
PM 8	Average satisfaction score from stakeholders, as per responses received to transactional surveys taken at forums and asked for in correspondence	0%	0%	0%	18%	11%	100%	11%	13%
PM 9	All categories of stakeholders are actively engaged by the system operator throughout the year	0%	0%	0%	0%	0%	0%	0%	0%
PM 10	% of industry submissions, made in response to system operator consultations, which are responded to	0%	0%	9%	18%	22%	0%	23%	7%
PM 11	Stakeholder engagement in project delivery	0%	0%	9%	9%	22%	0%	0%	5%
PM 12	Average satisfaction score from stakeholders from Annual Survey	0%	0%	0%	0%	0%	0%	0%	0%
PM 13	Average score from stakeholders on their perception of SO impartiality	0%	0%	0%	0%	0%	0%	0%	0%
PM 14	Number of thought leadership publications on specific areas of system operator work that affect and/or are of interest to the industry	17%	0%	18%	18%	11%	0%	0%	10%
PM 15	Active contribution by the SO to Authority led-forums and consultations; and industry-led consultations	0%	0%	18%	9%	0%	0%	0%	4%
PM 16	# of SO Industry Forums held	0%	17%	9%	18%	22%	0%	23%	11%
PM 17	% of key SOSPA documents delivered on time to the Authority	0%	0%	0%	0%	11%	0%	23%	2%
PM 18	Quarterly update/challenge/brainstorm sessions	17%	0%	18%	0%	0%	0%	11%	7%
TOTAL		100%	100%	100%	100%	100%	100%	100%	100%
Outcome weighting to overall outcome score		**20%**	**25%**	**20%**	**10%**	**10%**	**10%**	**5%**	